

of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in this Office Action mailed January 27, 2006, that is, the teachings of the U.S. patents to Kamiya, et al., No. 6,663,953, and to Watanabe, et al., No. 5,513,036, under the provisions of 35 USC 103.

With respect to the rejected claims, it is respectfully submitted that the teachings of the applied references would have neither taught nor would have suggested such a Fresnel lens sheet as in the present claims, whose surface of the light source side has a rugged structure, and has both an average pitch of 200 μm or smaller and 10 point roughness of 3-15 μm . See claim 1.

Furthermore, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such Fresnel lens sheet, or such rear projection screen utilizing such Fresnel lens sheet, as in the present claims, having features as discussed previously in connection with claim 1, and wherein the Fresnel lens substrate includes a copolymer resin of methyl methacrylate and styrene (see claims 5 and 13); and/or wherein the rugged structure of the surface of the light source side of the Fresnel lens sheet has such a height that labyrinth light within the Fresnel lens sheet and a reflected light from surfaces thereof are diffused (see claim 19); and/or wherein the average pitch is 150 μm or smaller and the 10 point roughness is 4-12 μm (see claim 21); and/or wherein the screen is obtained by assembling the Fresnel lens sheet according to claim 1 (or claim 19) and a lenticular lens sheet (see claims 9 and 20).

In addition, it is respectfully submitted that even assuming, arguendo, that the teachings of the applied references would have established a prima facie case of obviousness, the evidence in Applicants' specification, shown by the experimental

data in Examples 1-3 and Comparative Examples 1-3 on pages 10-13 of Applicants' specification, shows unexpectedly better results achieved according to the present invention, and overcomes any possible prima facie case of obviousness established by the teachings of the applied references. In this regard, it is respectfully submitted that this evidence in Applicants' specification must be considered in determining unobviousness of the presently claimed subject matter. See In re DeBlauwe, 221 USPQ 191 (CAFC 1984). This evidence in Applicants' specification will be discussed further infra.

The present invention is directed to a Fresnel lens sheet, and a rear projection screen for a rear projection television using such lens sheet.

A rear projection screen employed for a rear projection television is usually obtained by assembling a Fresnel lens sheet and a lenticular lens sheet. However, a light reflection on the surface of the Fresnel lens sheet, and a labyrinth light inside the Fresnel lens sheet, cause distortions on the projected image. That is, especially in the case where the screen of the rear projection television is watched from a lower level, the projected image on the upper area of the screen has multiple images, generally called ghosts. Such ghosts are considered to appear due to the labyrinth light within the Fresnel lens sheet and the reflected light from the surface of the light source side of the Fresnel lens sheet reflecting back on a reflection mirror and then entering the Fresnel lens sheet again. This problem of ghosts has been exacerbated in recent years, in view of improvements in luminance of the light source.

While various techniques have been proposed for overcoming the ghost problems (such techniques being described, for example, in the paragraph bridging pages 2 and 3 of Applicants' specification), such techniques have been insufficient,

particularly with respect to recent rear projection televisions employing recent light sources with highly elevated luminance.

Against this background, Applicants provide a Fresnel lens sheet, and a rear projection screen utilizing such lens sheet, overcoming problems including the aforementioned ghosts, and wherein the lens sheet can be easily provided. Applicants have found that by forming the lens sheet having a surface of the light source side with a rugged structure, with both an average pitch of 200 μm or smaller and 10 point roughness of 3-15 μm , problems in connection with prior structures are avoided. In particular, the ghost light becomes so weak that it essentially is not observed. Thus, Applicants provide a surface wherein labyrinth light within the Fresnel lens sheet and a reflected light from the surface are effectively diffused; and, moreover, the pitch of the surface of the light source side is sufficiently small so as to avoid observation of the rugged structure. Note, for example, the paragraph bridging pages 4 and 5 of Applicants' specification.

As for advantages achieved according to the present invention, attention is respectfully directed to the Examples and Comparative Examples on pages 10-13 of Applicants' specification, and the results shown in Table 1 on page 14 thereof. As can be seen therein, with use of the Fresnel lens sheet and rear projection screen in accordance with the present invention, labyrinth light inside the screen and a surface reflection are diffused effectively, and a ghost caused by them is remarkably reduced; and, accordingly, a rear projection television employing a Fresnel lens sheet and the rear projection screen of the present invention provide excellent images without ghost light.

Thus, it is emphasized, as can be see in Table 1 on page 14 of Applicants' specification, where the average pitch is within that recited in the present claims, but

the 10-point roughness is not (note Comparative Example 2 in this Table 1), the ghost reduction effect is small (see the key at page 10, lines 1-4 of Applicants' specification). Where both the 10-point roughness and average pitch are outside the scope of the present claims, as in Comparative Example 1, the ghost evaluation is poor (no ghost reduction effect is observed). Note that in the English specification of the above-identified application, the results for 10-point roughness and average pitch have been left blank for Comparative Example 3; however, as can be seen in Table 1 of the priority application for the above-identified application, Comparative Example 3 has a 10-point roughness of "0.1 μm >" and includes the phrase "cannot be measured" for the average pitch, and the ghost evaluation therefor is poor (no ghost reduction effect is observed). Compare with Examples 1-3, each having both 10-point roughness and average pitch within the scope of the present claims, and showing extremely excellent or excellent ghost reduction effect.

It is respectfully submitted that this evidence in Applicants' specification shows the unexpectedly better results achieved in having both average pitch and 10-point roughness within the scope of the present claims, even, e.g., as compared to when only one of these values is within the scope of the present claims, rebuts any conclusion of prima facie obviousness of the presently claimed subject matter, and supports a conclusion of unobviousness of the presently claimed subject matter.

Watanabe, et al. discloses a projection screen used for a rear projection type television set. The projection screen has a plurality of lens sheets, wherein the lens sheets are arranged in the order of a lenticular lens sheet, a linear Fresnel lens sheet, and a circular Fresnel lens sheet when seen from a viewer side. See column 2, lines 14-19. Note also column 18, lines 12-26, disclosing that in the optical system using the linear Fresnel lens, in particular, when the stray light causes a

white band extending in the horizontal direction, which can be observed more clearly than the rainbow image which tends to be produced in the circular Fresnel lens, a problem results from the standpoint of picture quality; and that this problem caused by the stray light can be avoided through use of a linear Fresnel lens sheet 6 (see Fig. 22) composed of a base film 14A formed of polyester and a Fresnel lens portion 14B formed of urethane acrylate based UV-hardened resin. This patent goes on to disclose that, further, the incident light side surface 18 of the base film 14A is processed to a matted surface 18 to diffuse light, by roughening the surface of the base film 14A or by applying a light diffusing ink or paint.

It is emphasized that Watanabe, et al. discloses avoiding problems caused by stray light, by roughening the surface of the base film 14A. It is respectfully submitted that this reference does not disclose, nor would have suggested, the problem with respect to multiple images being observed (called ghosts, that is, the ghost effect), and avoiding such problem with the surface of the light source side having a rugged structure with both average pitch and 10 point roughness as in the present claims.

The Examiner admits that Watanabe, et al. would not have disclosed the average pitch or 10 point roughness as in the present claims, but contends that "it has been held that where the general working conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art". However, even accepting the interpretation of Watanabe, et al. as applied by the Examiner, it is emphasized that this reference does not even disclose average pitch or 10 point roughness, much less that these parameters are result-affecting parameters. Especially emphasizing that the applied reference does not even disclose or suggest the average pitch and/or 10 point roughness as result affecting

parameters, it is respectfully submitted that there would have been no basis in the teachings of Watanabe, et al., for the conclusion by the Examiner that the discovery of an optimum or workable range “involves only routine skill in the art”. That is, absent a disclosure of the specific parameters (in this case, the average pitch and 10 point roughness) being result effecting parameters, it is respectfully submitted that there is no basis for the conclusion by the Examiner that discovery of the specific range for average pitch and 10 point roughness as in the present claims are merely discovery of “the optimum or workable ranges”, that involves “only routine skill in the art”.

Furthermore, it is again emphasized that Applicants have found specific ranges for both average pitch and 10-point roughness, wherein, when both ranges are satisfied, unexpectedly better results are achieved. It is respectfully submitted that the results achieved by the present invention are not obtained when only one of average pitch and 10 point roughness as in the present claims, is satisfied. Particularly in view of the unexpectedly better results achieved by the present invention, as seen in the evidence of record, it is respectfully submitted that Applicants have rebutted the conclusion by the Examiner that the presently claimed ranges for the average pitch and 10 point roughness are merely discovery of “optimum or workable ranges”; and it is respectfully submitted that the unexpectedly better results achieved according to the present invention clearly establish unobviousness thereof.

It is respectfully submitted that the additional teachings of Kamiya, et al. would not have rectified the deficiencies of Watanabe, et al., such that the presently claimed invention as a whole would have been obvious to one of ordinary skill in the art.

Kamiya, et al. discloses a Fresnel lens base sheet which can be used as screens of projection televisions, microfilm readers or the like, the base sheet being formed of a rubber-modified styrene resin comprising a rubber-like elastic material as dispersed particles and a styrene resin as a continuous phase, the styrene resin being further defined, and with amounts and diameter of the rubber-like elastic material being further defined. See column 2, lines 8-62. Note also the paragraph bridging columns 2 and 3, and the paragraph bridging columns 3 and 4, of this patent. Note further column 4, lines 21-27 and 32-35. Note further column 5, lines 18-24; and column 7, lines 46-52 and 57-60.


Even assuming, arguendo, that the teachings of Kamiya, et al. were properly combinable with the teachings of Watanabe, et al., such combined teachings would have neither disclosed nor would have suggested the presently claimed invention, including the rugged structure of the surface of the base sheet having both average pitch and 10 point roughness ranges as in the present claims, and unexpectedly advantageous results achieved thereby; and/or other features of the present invention as in the rejected claims, having such rugged structure with both such average pitch and 10 point roughness, and advantages achieved thereby.

In view of the foregoing comments, entry of the present Remarks, and reconsideration and allowance of all claims presently pending in the above-identified application, including previously rejected claims, are respectfully requested.

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Respectfully submitted,

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